

Claims.

- 1) Hybrid bacterial toxin subunit comprising an A1-part of Shiga-toxin or Shiga-like toxin fused to an A2-part of Escherichia coli heat-labile enterotoxin.
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- 2) Hybrid bacterial toxin subunit according to claim 1, characterized in that the A1-part is an A1-part of Stx2e
- 3) Hybrid bipartite bacterial toxin comprising five B-subunits of Escherichia coli heat-labile enterotoxin and the hybrid bacterial toxin subunit according to claim 1 or 2.
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- 4) Nucleic acid molecule comprising a nucleotide sequence encoding a hybrid bacterial toxin subunit according to claim 1 or 2.
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- 5) DNA fragment comprising a nucleic acid molecule according to claim 4.
- 6) Recombinant DNA molecule comprising a nucleic acid molecule according to claim 4 or a DNA fragment according to claim 5, under the control of a functionally linked promoter.
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- 7) Live recombinant carrier comprising a nucleic acid molecule according to claim 4, a DNA fragment according to claim 5 or a recombinant DNA molecule according to claim 6.
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- 8) Host cell comprising a nucleic acid molecule according to claim 4, a DNA fragment according to claim 5, a recombinant DNA molecule according to claim 6 or a live recombinant carrier according to claim 7.
- 9) Hybrid bacterial toxin subunit according to claim 1 or 2, a hybrid bipartite bacterial toxin according to claim 3, a nucleic acid molecule according to claim 4, a DNA fragment according to claim 5, a recombinant DNA molecule according to claim 6, a Live recombinant carrier according to claim 7 or a host
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cell according to claim 8 for use in a vaccine.

5 10) Vaccine comprising a hybrid bacterial toxin subunit according to claim 1 or 2 or a hybrid bipartite bacterial toxin according to claim 3, and a pharmaceutically acceptable carrier.

10 11) Vaccine comprising a nucleic acid molecule according to claim 4, a DNA fragment according to claim 5, or a recombinant DNA molecule according to claim 6 and a pharmaceutically acceptable carrier.

12) Vaccine comprising a live recombinant carrier according to claim 7 or a host cell according to claim 8 and a pharmaceutically acceptable carrier.

15 13) Vaccine comprising antibodies against a hybrid bacterial toxin subunit according to claim 1 or 2 or a hybrid bipartite bacterial toxin according to claim 3, and a pharmaceutically acceptable carrier.

20 14) Vaccine according to any of claims 10-13, characterized in that said vaccine comprises an additional antigen derived from a virus or micro-organism pathogenic to humans or animals, an antibody against said antigen or genetic information encoding said antigen.

25 15) Vaccine according to claim 14, characterized in that said virus or micro-organism is selected from the group of Pseudorabies virus, Porcine influenza virus, Porcine parvo virus, Transmissible gastro-enteritis virus, Rotavirus, *Brachyspira hyodysenteriae*, *Escherichia coli*, *Erysipelothrix rhusiopathiae*, *Bordetella bronchiseptica*, *Brachyspira hyodysenteriae*, *Shigella sp.*, *Salmonella choleraesuis*, *Salmonella typhimurium*, *Salmonella enteritidis*, *Haemophilus parasuis*, *Pasteurella multocida*, *Streptococcus suis*,
30 *Mycoplasma hyopneumoniae*, *Actinobacillus pleuropneumoniae*, *Staphylococcus hyicus* and *Clostridium perfringens*.

16) Use of a hybrid bacterial toxin subunit according to claim 1 or 2, a hybrid bipartite bacterial toxin according to claim 3, a nucleic acid molecule

according to claim 4, a DNA fragment according to claim 5, a recombinant DNA molecule according to claim 6, a live recombinant carrier according to claim 7, or a host cell according to claim 8 for the manufacture of a vaccine for combating *Shigella* or *Escherichia coli* infection.

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17) Method for the preparation of a vaccine according to claims 10-15, said method comprising the admixing of a hybrid bacterial toxin subunit according to claim 1 or 2, a hybrid bipartite bacterial toxin according to claim 3, a nucleic acid molecule according to claim 4, a DNA fragment according to claim 5, a recombinant DNA molecule according to claim 6, a live recombinant carrier according to claim 7, a host cell according to claim 8, or antibodies against a toxin according to claim 1-3, and a pharmaceutically acceptable carrier.

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